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Ensuring a competent public health responder workforce: The CDC experience

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Abstract

Introduction: From 2009 to 2016, the Centers for Disease Control and Prevention (CDC) activated its Incident Management System for a public health emergency 91 percent of the time. The CDC must ensure its workforce is prepared for the evolving nature of emergencies.

Objectives: The purpose of this assessment was to identify perceived preparedness and response training needs for the CDC responder workforce.

Methods: Between November 2012 and January 2013, focus groups and in-depth interviews were conducted with CDC responders, including senior leaders. The evaluation questions were: (1) How well does the current training system prepare CDC staff to respond to emergency events? (2) What gaps exist in the current training system? and (3) What trainings are essential and should be included in the training system?

Results: Eight focus groups were conducted with 51 responders and 18 interviews with response leaders. Themes were identified for each main outcome measure and translated to training improvements.

Conclusions: The CDC workforce received foundational training. Recommendations are provided to better prepare responders during an emergency. Periodic assessments are necessary to expand training and remain responsive to the complexities of emerging threats.

Keywords

needs assessment; education and training; public health preparedness; public health professional

INTRODUCTION

In the United States and abroad, natural disasters, disease outbreaks, and other emergency events have been complex, frequent, and increasingly costly in recent years.[1] As a result, emergency preparedness and response has been a top national priority in the United States.[2–5] A trained and skilled responder workforce is an essential component of the national capacity for emergency response, and there has been substantial national investment in preparing responders for the range of emergencies which they may face.[6,7]

Significant strides have been made toward understanding how best to train public health emergency responders. Researchers have identified core competencies public health emergency responders should possess.[8,9] Didactic, course-based trainings and experiential, application-based trainings have been developed to provide public health students and professionals with core competencies in response.[10–14] Emergency response trainings have been conducted at the local, state, and federal level, with the understanding that effective national emergency response depends on skilled, knowledgeable responders at all levels of response.[15]

The Centers for Disease Control and Prevention responder training system

As the nation's lead public health agency, the Centers for Disease Control and Prevention (CDC) plays a key role in supporting local responses to emergencies with public health consequences. CDC's Emergency Operations Center (EOC) serves as the command center for Incident Management System (IMS) activations.[16] From 2009 to 2016, the EOC was activated 91 percent of the time in support of 18 distinct emergency responses ranging from Ebola outbreak in West Africa, lead contamination of water in Flint, Michigan, unaccompanied children in Texas, and Polio eradication campaign, among others. Since 2014, CDC has led back-to-back IMS activations (for the response to Ebola and Zika virus outbreaks), relying on thousands of its staff to serve in multiple scientific and support functions. For example, approximately 4,000 CDC staff directly participated in the Ebola virus outbreak response, making it the largest response in CDC's history. Similarly, nearly 2,200 CDC staff have served in the Zika virus outbreak response to date. CDC must ensure that its responder workforce is able to meet the challenges associated with the scope and scale of these types of emergencies.

CDC trains its responders through a curricula of courses and exercises designed to increase staff knowledge, skills, and abilities needed to prepare for and respond to a public health emergency in-country and abroad. This training system includes an aggregation of classroom and experiential training developed and maintained across multiple preparedness

and response programs within CDC, as well as training offered by academic institutions, partner organizations, and other federal agencies.

Because CDC is a response agency, all CDC staff are required to complete select courses from the Federal Emergency Management Agency's (FEMA) National Incident Management System (NIMS) Training Program as preparatory training.[17] In 2008, CDC's Learning Office for Preparedness and Response and CDC University's School of Preparedness and Emergency Response (SoPER) organized the NIMS training courses into a hierarchy of four responder training tiers (see Table 1). The higher the tier, the more training the responder is required to complete, and the more complex the required trainings become to fit the associated response environment at that tier. Assessment and tracking of agency-wide compliance of completed NIMS training occurs twice per year.

Training available to CDC responders includes: "just-in-time" training; topic-specific training (chemical, biological, radiation, nuclear, environmental) offered by CDC subject matter experts; on-the-job training (eg, exercises, drills, table top exercises); and online and classroom-based courses offered through SoPER, which include preparedness and response courses developed by CDC, the US Department of State, and FEMA's NIMS Training Program.

Study design and questions

Following substantial national investment in training for emergency responders, there have been calls for the evaluation and ongoing improvement of developed training.[18–20] Given the evolving nature of emergency events[21] (eg, pandemic disease outbreaks, bio-terrorism, and complex humanitarian disasters affecting large populations), assessment and ongoing improvement of training are essential to ensure that responders are better equipped to respond to future emergency events.

To respond effectively to public health emergencies, response organizations must periodically assess and update their emergency response training curricula to ensure alignment of responder workforce needs and response activities. Preparedness trainings are most relevant and effective when they are based on the needs of the target audience.[22]

To assess responder training needs, CDC's Office of Public Health Preparedness and Response developed the following evaluation questions:

1. How well does the current training system prepare CDC staff to respond to emergency events?
2. What gaps exist in the current training system?
3. What other existing or potential trainings are essential and should be included in the training system?

METHODS

Qualitative methods were employed, including interviews and focus groups (FGs), to solicit feedback from responders to assess responder training at CDC and inform future training

activity. Qualitative methods have been used successfully in the past to assess the competencies and training needs of public health professionals, including emergency responders.[23–27]

Identification of potential participants for each interview and FG was based on established criteria (eg, number and amount of time served on a response, responder role, location/type of deployment). Participants were recruited from among CDC full-time staff who had served in an agency activation, deployment, and/or exercise between 2010 and 2012 (ie, 2012 Multistate Meningitis Outbreak, 2011–2012 Global Polio Eradication Initiative, 2011 Hurricane Irene, 2011 Fukushima/Japan Earthquake, 2010–2011 Haiti Cholera Outbreak, and 2010 Pandemic Influenza Exercise). A purposeful sampling approach was employed to ensure that a range of experienced responders were identified. The sampling frame was developed using CDC IMS staffing lists and organizational charts, deployment rosters, and participant data for the six agency activations referenced above.

Responders who had participated in multiple activations and served in a variety of roles were selected to participate in the needs assessment based on the role they served most frequently.

Interview and discussion guides were developed for the interviews and FGs based on the evaluation questions. Each instrument included a core set of questions, as well as specific questions tailored to each responder audience to identify training gaps (ie, incident managers [IMs], who lead agency responses, senior responders, who direct the fiscal, logistics, operations and planning of a response, and responders deployed to the field or assigned to the CDC EOC to support a response). The questions posed to IMs focused on leadership and knowledge transfer and sought to reveal individual's experiences that prepared them for the IM role, including classroom training, mentoring from other IMs, experiential learning during a response, as well as best methods to train and prepare future IMs. The questions posed in interviews to senior response leaders and FG participants were more specific to the training responders received from CDC, how well the trainings prepared them for responses, and suggestions for additional trainings to be added to the training system.

This training needs assessment did not require review by an institutional review board as this was deemed an internal evaluation activity to improve CDC's responder training system. However, standard data security measures were followed, as well as measures to protect the confidentiality of and comments associated with participants. All interviews and FGs were implemented and recorded by a facilitator and a note taker. To reduce bias and encourage candor, the interviewer/facilitator and note taker were not CDC staff. Interviews and FGs were recorded with the permission of all participants prior to each session with the use of release forms. Upon completion of all interviews and FGs, the recordings were transcribed.

A set of in-depth interviews were conducted with four IMs from among the 13 staff who had served in the IM role between September 2010 and September 2012. These four staff had served as IM on one or more responses and had accrued the most hours in the IM role.

In addition to the IM interviews, 14 brief interviews were conducted with senior responders who had served in two or more key leadership roles during agency activations between

September 2010 and September 2012. The IM interviews ranged from 20 to 40 minutes, and interviews with other response leadership ranged from 20 to 60 minutes.

Eight FGs were conducted with experienced responders. Seven FGs were held in-person at CDC in Atlanta, and one was held by conference call to accommodate CDC field-based staff. Inclusion criteria used to select and recruit participants for FGs are presented in Table 2. The goal was to have 8–10 participants per FG, for a total of 64–80 participants. To reach this goal, 144 individuals were recruited and 51 participated. FG sessions ranged from 60 to 90 minutes.

FG participation was limited to full-time staff who participated in an agency activation between September 2010 and September 2012 and served a minimum of 8 hours on an agency activation. Each FG was homogenous with regard to one or more characteristics thought to provide a unique perspective (eg, responders who were deployed to the field vs assigned to the EOC). The eight FGs were stratified by staff who served in a full-time responder role, staff with part-time response duties, and staff who volunteered for temporary duty in support of agency activations (see Table 2).

Data analysis was conducted by importing the transcripts from the FGs and interviews into ATLAS. ti version 6.2.28 (Scientific Software Development Gmbh, Berlin). Inductive and deductive codes were applied to all transcripts and aggregated to identify emergent themes. Theme counts can focus the analysis, mitigate bias, and provide evidence to decision makers of the prevalence of themes.[28,29] Analysis focused on the most frequently counted themes, with each FG and interview serving as one unit of analysis. Findings were supported by the number of themes with the highest frequencies.

The number of FGs in which a given theme emerged is identified by nomenclature "FG n = x/8" (see Table 3 footnote). Note that this number does not reflect the number of FG participants who discussed the theme, but rather the number of FGs in which a theme was discussed and there was agreement across participants. Each FG counted as one unit of analysis.

RESULTS

A total of 18 interviews and eight FGs were conducted. Staff from 13 of CDC's Centers, Institutes, and Offices participated in either an interview or FG for this needs assessment. The Fukushima/Japan Earthquake, Global Polio Eradication Initiative, and Haiti Cholera Outbreak were the most heavily represented CDC activations in the needs assessment. Below is a summary of results presented in response to each evaluation question. See Table 4 for a full summary of recommendations developed from the responder needs assessment findings.

How well does the current training system prepare CDC staff to respond to emergency events?

Participants described how they preferred to be trained and why these training modalities were most effective. Didactic, instructor-led trainings familiarize CDC staff with the basics

of emergency response. They increase responders' awareness of emergency response systems and protocols. Didactic trainings are especially effective when taught by an experienced instructor, ideally a CDC subject matter expert in public health emergency response. Participants stated didactic trainings allow for interaction with peers, which mimics the team-based approach in an actual emergency response. Classroom-based trainings were also preferred because of the separation they provide from other work responsibilities, which allows responders to devote their full attention to training.

When it comes to learning more than the basics, however, experiential learning was considered vital. Experiential learning methods described by responders include: (1) exercises and simulated scenarios; (2) shadowing experienced responders; (3) being mentored by a senior response leader; (4) receiving instruction from the responder being replaced; and (5) firsthand experience in emergency response.

Experiential learning is preferred because it builds upon the fundamentals, adjusting responders' expectations and teaching them their role(s) during a simulated or actual response. Additionally, responders have learned from, and want to learn more from the experience of other responders, particularly seasoned responders. Responders valued tabletop exercises and after-action reports, the latter of which include observations describing specific operational challenges faced during responses, and recommendations to address those challenges.

Though web-based training was not preferred by most participants, they acknowledged that it has a place within the training system, such as when material is foundational (eg, NIMS 100, 200, 700, and 800 courses, CDC EOC Orientation, and Deployment Health and Safety) or when attendance at in-person training is not realistic.

What gaps exist in the current training system?

One of the most frequently identified gaps in the current training system was the need for training that is customized to specific response roles, including staff who deploy to the field, scientists or subject matter experts, and key response leaders.

Training field responders.—Staff who are deployed to the field in support of a public health emergency response have a unique role in that they may be sent to locations where they have limited access to shelter, food, clean water, and other resources and amenities. They may work long hours and serve on deployment for extended periods of time depending on the nature and location of the response.

Participants stated that they are sometimes overwhelmed by their deployment experiences and felt new field responders would benefit from additional training on the reality of conditions faced during deployment, which may include harsh weather, community unrest, crime, lack of electricity, interagency conflicts, language barriers, and limited communication with family. Additionally, participants stated responders/deployed staff would benefit from training on interagency relations, conflict resolution, partner organizations with whom CDC collaborates, and travel clearance procedures for international deployments.

Training scientists.—Another group of responders who would benefit from customized training are CDC scientists who specialize in a given field of public health which may be central to a response. They are considered subject matter experts, and may be recruited as a responder because of their expertise, but have limited training or experience in preparedness and emergency response. As a result, scientists may be unfamiliar with CDC's IMS structure, protocols, or the unique inner workings of the EOC. Standard training courses like NIMS may not be suitable for scientists who respond infrequently, given the amount of time that may elapse between completion of a training and participation in an emergency response. Respondents recommended (1) the development of brief trainings on essential components of response for scientists, and (2) designation of a liaison during an activation that is "fluent" in both response and the science of the public health threat to bridge communication between scientists and response teams.

Training leaders.—Respondents held varying views on how well the training system prepares CDC leaders in public health preparedness and response. For example, one responder indicated that team leaders are well prepared but was not clear if it was CDC leadership training that prepared them or other training.

When asked how well CDC trains or prepares staff for IMS leadership roles, participants correctly noted that there were few initiatives to recruit or prepare future IMs, with the exception of training offered to Commissioned Corps Officers through the US Public Health Service. To prepare new IMs, participants suggested the following activities be incorporated into the current training system to ensure IM succession planning: (1) place potential IMs on command staff teams to gain experience via shadowing or observing IMs and other command staff; (2) coordinate meetings among IMs of domestic and international responses to share experiences and lessons learned; and (3) develop a formal career track for potential IMs, to include experiential training opportunities.

What trainings are essential and should be included in the future?

Existing trainings and educational opportunities most frequently identified by participants as essential include a range of courses offered by FEMA and CDC. Participants suggested more emergency response exercises conducted by CDC that vary in terms of level of engagement and cost.

The most extensive and realistic exercises are of greatest benefit to responders. Such exercises are intended to contribute to the smooth execution of actual responses. Exercises and drills allow for relationship building between responders, so when CDC activates its IMS structure, staff already know other responders, have observed them in their roles, and know how best to interact with them.

Participants wanted more opportunities to collaborate with and learn from partner response agencies, looking specifically at how they are structured and what systems they use during a response. Participants were interested in opportunities to exercise and train with these partners, including job exchanges with various agencies where staff could shadow, be mentored by, and learn from emergency responders from other organizations.

DISCUSSION

Participants described the CDC responder training system as one that prepares its responders with foundational or basic knowledge, but also recognized the system could be refined and strengthened. There is a need for more advanced, role-specific training, and experiential opportunities to reinforce concepts and practice. These findings are consistent with prior studies that indicate coupling didactic training with opportunities to apply learning is an effective approach to training emergency responders.[30] Exercises in particular have been shown to be a highly effective approach to training responders,[13,27] and they are valued because they provide an opportunity to practice in an environment where mistakes would not potentially cost lives. Training and exercises also allow responders to build relationships among teams, which can result in more effective interactions during a real emergency response. Mentoring and shadowing opportunities appear to be the most helpful in preparing senior leaders for the IM role. Besides NIMS training, there were limited references to preparedness and response training available for senior leaders. Succession plans are needed for when one IM rotates off a response and another begins. If a seasoned, frequently called-upon IM retires, takes extended leave, or for any number of reasons does not serve in this role, there is a risk for a large gap in knowledge and experience to backfill this crucial role.

Various challenges make it difficult for CDC staff to participate in preparedness and response training. Some staff lack support from supervisors to take time away from their regular duties to participate in training, a barrier that other studies have shown is not unique to CDC.[10] Results suggested that access to training was challenging for CDC staff located outside of the headquarters located in Atlanta, GA. Of the six responder trainings most frequently recommended by participants, five are multiple-day, classroom-based courses offered in Atlanta (see Table 3).

The CDC responder training system is a loosely aggregated compilation of responder training courses developed and maintained across multiple units within CDC as well as by universities and other federal agencies. Many of the recommendations raised by participants to improve the responder training system included activities, materials, and procedures already undertaken at CDC; however, participants were unaware these resources and training existed (eg, maps of the EOC, continuing education units for training courses, checklists for field deployment, and resilience training). These and other resources should be made more visible to current and potential CDC responders. Collaborations on Web site design, maintenance, and promotion are necessary to address the issue of how to promote these resources more widely across the agency.

LIMITATIONS

There were several limitations in this responder needs assessment. First, respondents were selected through purposive sampling. In addition, the sample size was small. Findings may therefore reflect a relatively narrow set of views or may reflect the views of those more inclined to participate in this type of evaluation. Recruitment was challenging, particularly for the FGs. There were three concurrent CDC IMS activations during the implementation of this assessment, which resulted in responders having limited time and availability to

participate due to deployments and competing priorities. Finally, findings were based on self-report and were therefore subject to recall and related biases.

FUTURE DIRECTION

CDC's Office of Public Health Preparedness and Response, Division of Emergency Operations (DEO) accepted many recommendations from this responder training assessment and is committed to working collaboratively with internal partners within CDC to refine the responder training system as a means of strengthening CDC response capacity. The Ebola Virus Response (2014) greatly accelerated interest in strengthening the responder training system and provided more specificity on gaps to address in training content and resources for enhanced responder performance. Specifically, the need for role-specific training of CDC response leaders was reinforced. Managing and coordinating complex public health emergency responses requires trained and experience leaders capable of handling the rigor and multifaceted demands of leading within an IMS structure. In 2015, DEO prioritized the establishment and implementation of the Incident Management Training and Development Program, a comprehensive training program designed to increase public health response leadership capacity and integrate response efforts across programs at CDC.

Incident-specific subject matter experts who may potentially serve in a response leader role, such as the IM, Deputy IM, or Task Force Lead, serve as the target audience for this novel and customized CDC training program. The curriculum for this role-specific leadership training is modular in format and incorporates a didactic component, applied activities with CDC-specific examples, and strategic concepts woven throughout the module by an infectious disease case study. All trainings will be delivered by experienced CDC response leaders in a classroom environment with small groups to foster a team-based approach.

There are many examples of improvements currently underway to increase the number and type of experiential learning opportunities, broaden access to trainings for field-based staff, and institute virtual tabletop exercises (VTTX). First, a 4-day public health readiness course at SoPER was enhanced with a simulation exercise that is applicable to four scenarios (ie, radiological event, hurricane, pandemic influenza, and foodborne illness outbreak) to increase hands-on interactivity for participants. Second, by using remote access capabilities, responders at CDC quarantine stations and field offices are being trained. In FY2015, 11 distance-based trainings were initiated with remote access. Third, DEO instituted a novel preparedness and response exercise program in 2013 that is reshaping CDC's approach to preparing for emergencies. This VTTX series takes CDC beyond the traditional form of discussion-based preparedness exercises by adding a virtual component and capitalizes on video teleconferencing technology to link participating programs virtually, rather than physically. Over the last 2 years, nine VTTX were offered.

CONCLUSIONS

Insights and opinions were collected from those who know the CDC responder training system the best: CDC responders themselves. From those perspectives, practical and actionable recommendations for the enhancement of CDC's responder training system were

developed and later translated to actionable recommendations that have been prioritized for implementation. Findings coincided with results from other studies on the training needs of emergency responders,[12,23,25] suggesting that the training needs of CDC responders are not unique. Needs assessments of this scale should be conducted periodically as a building block for a continuously improving training system that is flexible and responsive to the evolving training needs of the responder workforce given the complexity of domestic and global health emergencies.

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Table 1.

CDC responder training tiers

CDC responder training tiers		Courses required
Tier 1	Employees *not* routinely assigned to the CDC EOC or deployed to the field	• IS-700.a NIMS: An Introduction (or IS-700)
Tier 2	Employees with potential for assignment to the CDC EOC	• Tier 1 course plus • IS 100.b Introduction to ICS (or IS-100 or IS-100.a) • IS-200.b ICS for Single-Resources (or IS-200 or IS-200.a) • IS-800.b NRF: An Introduction (or IS-800)
Tier 3	Employees with potential for deployment to the field	• Tiers 1 and 2 courses plus • ICS 300 Intermediate ICS
Tier 4	Employees with IMS leadership and liaison roles in the CDC EOC and when deployed to the field	• Tiers 1,2, and 3 courses plus • ICS 400 Advanced ICS

Table 2.

Inclusion criteria for FG participants

Description of response duties	FG composition	Number of FGs
Full-time preparedness and response duties (>50 percent of day job)	OPHPR * staff with full time public health preparedness and response roles	1 (n = 8)
	Agency wide (non-OPHPR) † staff with full-time public health preparedness and response roles	1 (n = 7)
Part-time preparedness and response duties (<50 percent of day job)	CDC Emergency Coordinators	1 (n = 5)
	CDC field-based staff with preparedness and response duties (eg, CDC fellows, Epidemic Intelligence Service Officers, quarantine station staff [by phone])	1 (n = 6)
Response duties only when activated to support incident or exercise	Staff deployed to field	2 (n =14)
	Staff deployed to EOC/IMS functional desk	2 (n =11)

*CDC's Office of Public Health Preparedness and Response.

†CDC's National Center for Emerging and Zoonotic Infectious Diseases, National Center for Environmental Health/Agency for Toxic Substances and Disease Registry, National Center for Immunization and Respiratory Diseases, and Center for Global Health.

Table 3.

Frequency of findings, organized by study question

Finding	Number of participants or FGs reporting*
Question 1:How well does the current training system prepare CDC staff to respond to emergency events?	
Preferred modes of training	
Didactic training: in-person, classroom-based training	n = 7/14 (50 percent); FG n = 7/8 (88 percent)
Didactic training: web-based training	n = 6/14 (43 percent); FG n = 5/8 (63 percent)
Experiential training: exercises	n = 5/14 (36 percent); FG n = 5/8 (63 percent)
Experiential training: mentoring opportunities	n = 6/14 (43 percent); FG n =1/8 (13 percent)
Experiential training: reviews of past responses	n = 4/14 (29 percent); FG n =1/8 (13 percent)
Challenges to accessing and completing trainings	
Limited time due to demands of nonresponse job duties	n = 8/18 (44 percent); FG n = 2/8 (25 percent)
Lack of supervisor support	n = 6/18 (33 percent); FG n = 0/8 (0 percent)
Inability to get into in-person trainings that quickly reach capacity	n = 6/18 (33 percent); FG n = 0/8 (0 percent)
Travel restrictions for participants not based in Atlanta, GA	n = 0/18 (0 percent); FG n = 4/8 (50 percent)
Question 2: What gaps exist in the current training system?	
Gaps exist in the current training system	
Coordinated efforts do not exist to recruit or prepare future IMs beyond Commissioned Corps training received through the Public Health Service	n = 4/4 (100 percent)
The different training needs of field responders versus EOC responders are not adequately recognized within the training system	n = 9/14 (64 percent); FG n = 0/8 (0 percent)
There are limited trainings related to interagency relations and collaboration	n = 7/14 (50 percent); FG n = 4/8 (50 percent)
Training requirements are not enforced and do not serve as criteria for participation in a response	n =1/14 (7 percent); FG n = 4/8 (50 percent)
Trainings are foundational and do not prepare them for the variation in how responses are structured	n = 4/14 (29 percent); FG n = 2/8 (25 percent)
There is frequently a considerable time lapse between training and the opportunity to apply knowledge during a response	n = 5/14 (36 percent); FG n = 0/8 (0 percent)
Trainings are needed to prepare field responders for harsh conditions and political issues faced during deployment	n = 2/14 (14 percent); FG n = 3/8 (38 percent)
Field responders identified limited training opportunities related to the basics of international CDC travel and travel clearance	n = 0/14 (0 percent); FG n = 3/8 (38 percent)
There are limited opportunities to train with emergency responders from other organizations	n = 2/14 (14 percent); FG n = 2/8 (25 percent)
There is a need to develop concise, highly relevant trainings for scientists	n =1/14 (7 percent); FG n = 2/8 (25 percent)
A just-in-time training on the EOC communications and data reporting system is needed for those who use it infrequently	n =1/14 (7 percent); FG n = 2/8 (25 percent)
Finding	**Number of participants or FGs reporting***

Finding	Number of participants or FGs reporting*
Question 3: What trainings are essential and should be included in the system?	
Training opportunities most frequently identified as essential or helpful in the past	
FEMA NIMS courses	n =14/18 (78 percent); FG n = 6/8 (75 percent)
EOC 101	n =12/18 (67 percent); FG n = 3/8 (38 percent)
Pandemic influenza full-scale exercise conducted prior to the H1N1 outbreak	n = 6/18 (33 percent); FG n = 2/8 (25 percent)
CDC environmental health training in emergency response course	n = 4/18 (22 percent); FG n = 3/8 (38 percent)
Deployment safety and resilience training	n = 4/18 (22 percent); FG n = 2/8 (25 percent)
Public health readiness certificate program	n = 2/18 (11 percent); FG n = 4/8 (50 percent)
More exercises, drills, and simulations should be conducted in the future	n = 4/18 (22 percent); FG n = 5/8 (63 percent)

* Table 3 presents the most frequently expressed themes. Because the same number and types of questions were not asked to both categories of interview participants, results are presented in a manner that shows only those who were given the opportunity to respond. The number of interview participants who stated a particular comment within a theme is identified by nomenclature "n = x/y," where "x" is the number of participants or FGs stating the theme, and "y" is the total number of participants or FGs that are asked the question. Questions posed only to IM are identified by "n = x/4"; questions posed only to responders who have served in a senior, command, or lead role are identified by "n = x/14"; and questions posed to both groups are identified by "n = x/18." The number of FGs in which a given theme emerged is identified by nomenclature "FG n = x/8." Note that this number does not reflect the number of FG participants who discussed the theme but rather the number of FGs in which a theme was discussed and there was agreement across participants.

Table 4.

Recommendations for the improvement of the CDC responder training system

Recommendation 1:Better organization of existing trainings and resources • Dedicate time and staff resources to better organize existing materials and available trainings into a visible, easy-to-access web location. • Market responder training courses internally and increase visibility of trainings. • Organize all relevant training resources into a single location, and ensure consistency across the list of preparedness and response-related training.
Recommendation 2: Introduce succession planning for IMs • Collaborate with other federal response agencies to learn how their leaders are prepared for and assigned the role of IM. • Interview or convene a group of CDC IMs to hear their perspectives on what to include in succession planning.
Recommendation 3: Move beyond foundational learning • Develop training courses or activities (or enhance existing courses) that go beyond the foundational level to include role-specific training and experiential learning for seasoned responders. Include more case studies and exercises in didactic courses. • Develop more in-depth training related to field deployment activities, specifically covering international deployments, cultural competency, and political aspects of working with foreign nationals.
Recommendation 4: Train on cross-sector connections • Develop opportunities for cross-agency and interagency training, partnerships, collaborations, and relationship-building. • Allow CDC responders to train with, shadow, mentor, or learn from emergency responders from other organizations.
Recommendation 5: Increase training accessibility for non-headquarters staff • Offer training opportunities at CDC field office for non-Atlanta-based staff (domestic and international). • Consider scheduling popular response courses before or after large conferences so travelers can attend both conferences and trainings.